

REMARKS

Upon entry of this amendment, claims 1-6 and 10-12 are all the claims pending in the application. Claims 7-9 are canceled by this amendment.

Applicants note that a number of editorial amendments have been made to the specification for grammatical and general readability purposes. No new matter has been added.

I. Claim Rejections under 35 U.S.C. § 101

The Examiner has rejected claims 7-10 under 35 U.S.C. § 112, first paragraph as being directed to non-statutory subject matter because these claims are directed to a computer program per se.

Regarding claims 7-9, Applicants note that these claims were directed to a computer program, and therefore, these claims have been canceled by this amendment. Regarding claim 10, however, Applicants note that this claim is directed to a recording medium having a program recorded thereon, and therefore, it is submitted that claim 10 is directed to statutory subject matter.

In view of the foregoing, Applicants kindly request that the above-noted rejection be reconsidered and withdrawn.

II. Claim Rejections under 35 U.S.C. § 103(a)

A. Claims 1, 4, 7 and 10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kimura (U.S. 5,862,580) in view of Oyama (U.S. 6,860,002).

Claim 1, as amended, recites the features of determining, for each of the components held by the component holding members, a mounting preparation time on a basis of (1) a conveyance time required for conveyance of the component to a mounting position and (2) a recognition time required for recognition of the component by the component image pickup section; and comparing the determined mounting preparation times for the components held by the component holding members. Applicants respectfully submit that Kimura and Oyama do not teach or suggest such a combination of features.

Regarding Kimura, Applicants note that this reference relates to an apparatus for mounting electronic components on a circuit board. As shown in Figs. 1 and 2 of Kimura, the apparatus includes a plurality of tool heads 7 that are able to move in the X-Y directions, a plurality of components supplying devices 14, and a plurality of circuit boards 9. In Kimura, each of the tool heads 7 has a plurality of nozzles 8 disposed thereon, wherein chip components 13 can be absorbed and released by the nozzles 8 (see col. 7, lines 32-59).

As explained in Kimura, the chip components 13 can be mounted from a predetermined mounting position located closest to the components supplying apparatus where previous gripping of the electronic components was performed such that the transporting distance is shortened between the components supplying region and a components mounting region (see col. 4, lines 31-42). As also disclosed in Kimura, after a chip component 13 is absorbed by one of the nozzles 8, a vision camera system is utilized to confirm the absorption condition of the chip component 13 (see col. 9, lines 48-51 and col. 10, lines 32-37).

Regarding Oyama, Applicants note that this reference discloses an apparatus for mounting electronic components on a circuit board. As shown in Fig. 1 of Oyama, the apparatus includes a plurality of mounting heads 7 for transporting the electronic components from component feeding units 3 to a printed circuit board P, wherein each of the mounting heads 7 has a plurality of suction nozzles disposed thereon for gripping the electronic components (see col. 3, lines 60-67).

As described in Oyama, the apparatus also includes a plurality of recognition cameras 16 for recognizing an amount of positioning error of the electronic component relative to a suction nozzle in the X and Y directions (see col. 4, lines 8-14). Also, in Oyama, a recognition processing unit 33 is provided which utilizes the images taken by the cameras 16 to perform recognition processing on the image, wherein the time for component recognition processing is utilized when arranging the order of the components to be mounted (see col. 4, lines 55-65 and col. 6, lines 25-31).

Based on the foregoing descriptions of Kimura and Oyama, Applicants note that while Kimura discloses that a transporting distance of the electronic components is taken into account when mounting the components, and Oyama discloses that the time for component recognition processing is utilized when arranging the order of the components to be mounted, Applicants respectfully submit that the combination of Kimura and Oyama does not suggest the features of determining, for each of the components, a mounting preparation time on a basis of (1) a conveyance time required for conveyance of the component to a mounting position and (2) a recognition time required for recognition of the component by the component image pickup

section; and comparing the determined mounting preparation times for the components, as recited in amended claim 1.

In view of the foregoing, Applicants submit that the combination of Kimura and Oyama does not disclose, suggest or otherwise render obvious all of the features recited in amended claim 1. Accordingly, Applicants submit that claim 1 is patentable over the cited prior art, an indication of which is kindly requested.

Regarding claim 4, Applicants note that this claim recites the feature of a component holding head having a plurality of component holding members and a component image pickup section, wherein the component image pickup section is configured to capture images of components held by the component holding members, and wherein the component image pickup section is operable to move along an array of the component holding members. Applicants respectfully submit that Kimura and Oyama do not teach or suggest such a feature.

Regarding Kimura, it is noted that while this reference discloses a tool head 7 having a plurality of nozzles 8, and also discloses the use of a camera vision system that confirms the direction of a chip component (see col. 9, lines 48-51), Applicants submit that the camera vision system in Kimura is clearly not a part of the tool head 7. As such, Applicants respectfully submit that Kimura does not disclose the feature of a component holding head having a component image pickup section, wherein the component image pickup section is operable to move along an array of the component holding members, as recited in claim 4.

Regarding Oyama, it is noted that while this reference discloses a mounting head 7 that has a plurality of nozzles 8, and also discloses the use of cameras 16 (see Fig. 1), Applicants

submit that the cameras 16 are clearly stationary elements, and are not formed as part of the mounting head 7. As such, Applicants respectfully submit that Oyama does not disclose the feature of a component holding head having a component image pickup section, wherein the component image pickup section is operable to move along an array of the component holding members, as recited in claim 4.

In view of the foregoing, Applicants respectfully submit that claim 4 is patentable over the combination of Kimura and Oyama, an indication of which is kindly requested.

In addition, regarding claim 4, Applicants note that this claim also recites the feature of a control device operable to, for each of the components held by the component holding members, determine a mounting preparation time on a basis of a conveyance time required for conveyance of the component to a mounting position and a recognition time required for recognition of the component by the component image pickup section; to compare the determined mounting preparation times for the components held by the component holding members; and to determine a mounting sequence for the components held by the component holding members on a basis of a result of the comparison of the determined mounting preparation times.

For at least similar reasons as discussed above regarding claim 1, Applicants respectfully submit that the combination of Kimura and Oyama does not teach, suggest or otherwise render obvious such a feature. Accordingly, Applicants submit that claim 4 is patentable over the cited prior art, an indication of which is kindly requested.

Regarding claim 10, Applicants note that this claim has been amended in a similar manner as claim 1 so as to recite the features of determining, for each of the components held by

the component holding members, a mounting preparation time on a basis of a conveyance time required for conveyance of the component to a mounting position and a recognition time required for recognition of the component by the component image pickup section; and comparing the determined mounting preparation times for the components held by the component holding members.

For at least similar reasons as discussed above regarding claim 1, Applicants respectfully submit that the combination of Kimura and Oyama does not teach, suggest or otherwise render obvious such features. Accordingly, Applicants submit that claim 10 is patentable over the cited prior art, an indication of which is kindly requested.

B. Claims 2, 5, 8 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura in view of Oyama and further in view of Schaffer (U.S. 6,260,178)

Claim 2 depends from claim 1; claim 5 depends from claim 4; and claim 11 depends from claim 10. Applicants respectfully submit that Schaffer fails to cure the deficiencies of Kimura and Oyama, as discussed above, with respect to claims 1, 4 and 10. Accordingly, Applicants submit that claims 2, 5 and 11 are patentable at least by virtue of their dependency. As noted above, claim 11 has been canceled.

C. Claims 3, 6, 9 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura in view of Oyama, and further in view of Huber et al. (U.S. 6,973,713).

Claim 3 depends from claim 1; claim 6 depends from claim 4; and claim 12 depends from claim 10. Applicants respectfully submit that Huber fails to cure the deficiencies of Kimura and Oyama, as discussed above, with respect to claims 1, 4 and 10. Accordingly, Applicants submit that claims 3, 6 and 12 are patentable at least by virtue of their dependency. As noted above, claim 9 has been canceled.

III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may best be resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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July 5, 2006